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## DEVICE AND PROCESS FOR ENGAGING AND DISENGAGING A ROLLER OF A PRINTING PRESS

The present invention pertains to a device and a process for engaging and disengaging a roller of a printing press with and from a mating roller.

It is frequently necessary during the printing operation to engage and disengage individual rollers with and from other rollers. Individual rollers, e.g., an applicator roller, are engaged here simultaneously with both a plate cylinder and a distributor roller, and a so-called "nip," i.e., a contact surface, at which the surfaces of the rollers that are in contact with one another touch each other, is formed in the area of the contact between two rollers that are in contact with one another. It is generally preferred that a roller be in contact with a mating roller with the most constant pressure possible.

10 A device for mounting and positioning a roller of a printing press, in which the roller is engaged with at least one mating roller and is mounted on both sides in a bearing shell, is known from the Applicant's DE 198 11 053 A1, whose teaching concerning the mounting and positioning of a roller is included in this application. These bearing shells are connected with a press frame by means of

at least one spring element.

Figure 3 shows a so-called intermediate roller 1, which is engaged with two stationary mating cylinders 3 and 4. The intermediate roller 1 is engaged with the mating rollers 3 and 4 usually along the bisecting line of the angle of the triangle formed by the axes of rotation of the rollers 1, 3 and 4, starting from the axis of rotation of roller 1, between the two axes of rotation of the rollers 3 and 4 and it comes simultaneously in contact with the mating rollers 3 and 4.

The object of the present invention is to suggest a device and a process for engaging and/or disengaging a roller of a printing press with/from a mating roller, which make possible rapid engagement and disengagement operations.

This object is accomplished according to the present invention by the device and process defined in the independent patent claims. Advantageous embodiments appear from the subclaims.

A roller shall be engaged according to the present invention such that it is in contact with at least two rollers in the engaged state. This happens, e.g., in the case of an applicator roller that shall be in contact with a distributor roller and a plate cylinder.

The device according to the present invention for engaging and/or disengaging a roller of a printing press with or from a first mating roller, so that the roller is in contact with the first mating roller and with a second mating roller in the engaged state, has a basic unit, with which the roller can be guided or moved in the circumferential direction or in the tangential direction of the second mating

roller such that the roller is preferably continuously in contact with the second mating roller and can thus be moved, e.g., along a circular path in the direction of the first mating roller until the roller comes into contact with the first mating roller. Likewise, the roller can also be moved away from the first mating roller with the basic unit. The basic unit provided according to the present

5 invention is consequently designed such that the roller can be mounted or guided along the second mating roller such that at least one partial area of the surface of the roller and of the second mating roller preferably touch each other without interruption, i.e., that the roller is preferably engaged continuously with the second mating roller. As a result, the roller can already rotate together with the second mating roller in contact with it and if, e.g., an applicator roller is in contact with a

10 distributor roller and is guided along the surface of the distributor roller for engaging with a plate cylinder, the applicator roller can be prevented from running dry. Thus, the roller needs to be engaged according to the present invention with a single mating roller only, because it is preferably already in continuous contact with the second mating roller.

Thus, it is possible according to the present invention to set the contact between the roller and the

15 mating roller that is in contact therewith already before the roller is engaged with the additional mating roller. For example, the nip can already be set and only a single engaging operation with an additional mating roller is necessary to bring the roller into contact with two mating rollers.

Thus, control units for positioning the roller to be engaged can be simplified with the device

according to the present invention and, e.g., electric motors and potentiometers for the simultaneous

20 engagement of the roller with two mating rollers in the correct position with correspondingly complicated actuating mechanisms can be eliminated.

The device according to the present invention for engaging and/or disengaging a roller with or from a mating roller may be provided, in principle, for every individual roller of a printing press. The present invention is preferably used for at least one, several or each rubber cylinder, for example, in the inking system and/or in the dampening system. For example, rider rollers, distributor rollers,  
5 ink applicator rollers and/or other rollers that are directly or indirectly adjacent to the rollers can be engaged or disengaged with the device according to the present invention or with the process according to the present invention. It is possible, in principle, with the device according to the present invention or with the process according to the present invention to engage or disengage one, two or even more rollers in a printing press or in a printing couple with or from one, two or more  
10 than two mating rollers together or independently from one another.

The basic unit advantageously has a pneumatic element for adjusting the basic unit, as a result of which very fast engaging and/or disengaging movements can be carried out and it is thus possible, e.g., to embody steep run-up sequences with a minimum amount of spoilage or fast disengagement operations, e.g., in case of an emergency stop, while curling in inking systems is avoided at the  
15 same time.

To move the roller in the circumferential direction of the second mating roller, the basic unit can be preferably adjusted transversely, i.e., at right angles to a radial direction or in parallel to a tangential direction of the second mating roller. As a result, it becomes possible to set any desired nip ratio between the roller and the first and second mating cylinders. If the basic unit is moved, for  
20 example, to a mating roller in a straight-line continuation of a tangential direction, the pressure distribution on the contact surfaces of the roller on the first and second mating cylinders can be set

and it can thus be ensured, for example, that the same nip is always present at the contact points on the first and second mating rollers. For example, the nip ratio between an applicator roller and a plate cylinder or the distributor roller can be set or adjusted in one embodiment by a corresponding transverse adjustment of the basic unit in relation to the distributor roller and/or to the plate

5 cylinder.

A feed unit is advantageously provided, which is in connection with the roller or in which the roller is mounted and with which, e.g., an engaging pressure of the roller on one or two mating rollers can be set or generated. The feed unit may be connected, e.g., rotatably or rigidly to the basic unit.

10 The feed unit preferably has a carriage for this purpose, on which pressure is applied, e.g., by a spring or another suitable element and can mount the roller, e.g., an applicator roller, in the known manner in two half shells.

A setting element, e.g., an adjusting spindle, is advantageously provided, with which a pressure, e.g., the spring pressure on the carriage, can be changed in order to set the engaging pressure of the roller mounted in the carriage on the mating cylinder or mating cylinders can be set and, for

15 example, desired nip widths can be achieved at the mating cylinders, i.e., for example, at the plate cylinder and at the distributor roller,

The feed unit is preferably located in the axis of the bisecting line of the angle between the first and second mating cylinders, i.e., for example, between the plate cylinder and the distributor roller, e.g., in the engaged state, as a result of which the engaging pressure generated by the feed unit and

20 acting on the roller acts approximately uniformly on the two mating cylinders, so that the nip ratio

between the mating cylinders is approximately equal. However, the nip ratio can be changed by deflecting the feed unit or the element provided for generating the engaging pressure, for example, a spring, from the mentioned bisecting line of the angle in order to generate, for example, a greater nip width in one mating cylinder than in another mating cylinder.

- 5      The basic unit and the feed unit are preferably coupled with one another and are advantageously mounted such that they are rotatable in relation to one another, so that, for example, the roller is connected to the basic unit via the feed unit and the basic unit can guide the roller together with the feed unit in the circumferential direction of the second mating roller such that the roller is engaged with or disengaged from the first mating roller. The feed unit can now be rotated into such a
- 10     position that a spring element present in the feed unit presses a carriage carrying the roller such that a desired nip ratio can be achieved.

Thus, rollers can be engaged and disengaged very rapidly by means of the device according to the present invention, and it is possible to set a nip or even a nip ratio that is preserved regardless of the velocity, heating of the rollers or in case of a possible swelling or shrinkage or can also be regulated automatically. It is thus possible to embody an applicator roller bearing that automatically compensates the nip, and the nips can also be adapted to changes within certain limits.

Printing units with plate cylinders with very small channel widths, e.g., with a minigap slot splitting, or channelless plate cylinders, e.g., of the sleeve design, are advantageously used. It can be ensured as a result that channel beat, which could lead to vibrations, does not practically occur on the roller, which is pretensioned by a spring, e.g., the applicator roller.

The present invention also pertains, furthermore, to a process for engaging and/or disengaging a roller of a printing press with or from a first mating roller, wherein the roller is engaged with a second mating roller and the roller is guided in the engaged state in the tangential or circumferential direction of the second mating roller until the roller is engaged or in contact with the first mating roller or is disengaged therefrom.

The roller now remains continuously in contact with the second mating roller, i.e., a partial area of the roller is in contact with a partial area of the second mating roller.

The nip, a nip ratio or the pressing pressure or the engaging pressure of the roller can be especially preferably set on one or two mating rollers, e.g., by setting or changing a force acting on the roller in a suitable manner.

The present invention will be described below on the basis of a preferred embodiment. In the drawings,

- Figure 1 shows a schematic diagram of a pneumatic NC applicator roller bearing;
- Figure 2 shows a schematic view of an NC feed unit;
- Figure 3 shows an intermediate roller engaged with two stationary mating rollers; and
- Figure 4 shows a schematic diagram of an inking and dampening system of an offset printing press.

Figure 1 shows an embodiment of a device according to the present invention with an applicator roller 1, which can be adjusted by a basic unit 2 along the surface of the distributor roller 4 acting as

a second mating cylinder. The basic unit 2 can be moved according to the present invention preferably pneumatically such that the feed unit 5, in which the applicator roller 1 is mounted, is moved such that the applicator roller 1 is guided along the circumference of the distributor roller 4 until the applicator roller 1 is engaged with the plate cylinder 3 provided as the first mating cylinder. The applicator roller thus remains continuously in contact with the distributor roller 4, as 5 a result of which the applicator roller 1 is prevented from running dry.

The basic unit 2 can be adjusted transversely in the direction indicated by the arrows A in order to set a desired nip ratio between the applicator roller 1 and the plate cylinder 3 or the distributor roller 4 by such a transverse adjustment.

10 The feed unit 5, mounted rotatably in the basic unit 2, has a spring element, which generates a spring pressure on a carriage 8, wherein the thickness of the spring pressure generated by the spring 6 can be set by means of the adjusting spindle 7. The applicator roller 1 is mounted by means of the carriage 8 in two half shells in the known manner. A nip ratio of about 1:1 can be achieved if the feed unit 5 is on the axis of the bisecting line of the angle, which bisects the angle  $2\alpha$  that is formed 15 by the centers of the plate cylinder 3, the applicator roller 1 and the distributor roller 4, i.e., if the spring element 6 preferably lies on the bisecting line of the angle such that a pressure that acts approximately equally on the plate cylinder 3 and on the distributor roller 4. Another nip ratio can be set by deflecting the feed unit 5 or the spring element 6 pressing the carriage 8 from the bisecting line of the angle.

20 Figure 2 shows the feed unit 5, which is connected by a hinge 9 to the basic unit 2 and is mounted

rotatably in same.

An adjusting spindle 7, with which the pressure acting on the spring 6 can be set, is provided at the feed unit 5. The spring 6 presses the carriage 8, and an opposite spring 6a may be optionally provided, which likewise presses the carriage 8 in order to compensate, e.g., the weight of the  
5 applicator roller 1. The applicator roller 1 is mounted rotatably in the carriage 8 and can thus be engaged or disengaged, e.g., pneumatically in an approximately tangential direction in relation to the distributor roller 4, and the nip at the plate cylinder 3 and/or at the distributor roller 4 and, in case of a suitable position of the spring 6 or of the feed unit 5, also the nip ratio can be set by pretensioning the spring 6, which is advantageously arranged approximately along the above-  
10 described bisecting line of the angle between the plate cylinder 3 and the distributor roller 4.

For example, the applicator roller 1 and the distributor roller 4 are in functional connection and there is no functional connection between the applicator roller 1 and the plate cylinder 3 during the run-up of the printing press. At the beginning of the printing operation, the applicator roller 1 is engaged with the plate cylinder 3 while maintaining the functional connection with the distributor  
15 roller 4 and is again disengaged from the plate cylinder 3, e.g., to perform a washing operation, in order to be then in functional connection with the distributor roller 4 only.

Figure 4 shows a schematic view of an inking and dampening system of an offset printing press and shows as an example rollers that are engaged and/or disengaged with the device according to the present invention or the process according to the present invention. In particular, the rollers  
20 mentioned by name and/or also rollers that are directly or indirectly adjacent to same can also be

engaged or disengaged with the device according to the present invention with the mating cylinders shown.

Even though it was described in the exemplary embodiment that the applicator roller 1 is guided along the distributor roller 4 in order to engage this [applicator roller] with the plate cylinder 3, the  
5 reverse procedure is possible, in principle, as well.